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enough were both 'clods of the valley' before the twelvemonth had expired.

I have thus given a few notes respecting this region, and hope at a future period to supply some of their deficiencies. Through the kindness of Providence, and a rigid system of abstinence in living, I have hitherto preserved my health. My habits are to rise early,—to wash and sponge immediately from head to foot,—to take some active exercise always before breakfast,—through the day to act as my feelings and occasions suggest, with little or no particular precaution, only avoiding acid or even green food; and at night, before going to bed, to rub my whole body with a very coarse hair-glove or flesh-brush, thus clearing the pores, and equalizing the whole circulation. I mention these particulars on account of the remarkable benefit I have experienced from attending to them. J. E. A.

V.—*Some Remarks relative to the Geography of the Maldiva Islands, and the Navigable Channels (at present known to Europeans) which separate the Atolls from each other.* Communicated by James Horsburgh, Esq., Hydrographer to the East India Company. Read 9th January, 1832.

THE mutability of geographical knowledge, in one case, has been noticed in the first number of the Journal of the Royal Geographical Society, by a member who has evinced uncommon energy in the elucidation of science in general, and of geography in particular,—New Shetland Isles, as there stated, being only a *re-discovery* by Mr. Smith in 1819. And the fact of either these isles, or Trinity Land to the south of them, having been seen September 7, 1599, by Dirck Gheritz, in the Dutch ship, appears not to have been believed by navigators, although in vol. ii., p. 198, Burney's South Sea Discoveries, it is recorded, that the yacht of 150 tons burthen, commanded by the above-named navigator, was separated from the other four ships, her consorts, in a storm, and 'carried by tempestuous weather to the south of the strait (Magalhaens) to 64° south latitude, where they discovered a high country, with mountains, which were covered with snow, like the land of Norway *.'

Another remarkable case, relating to oriental geography, has been noticed by the late Mr. Dalrymple, in his memoir concerning

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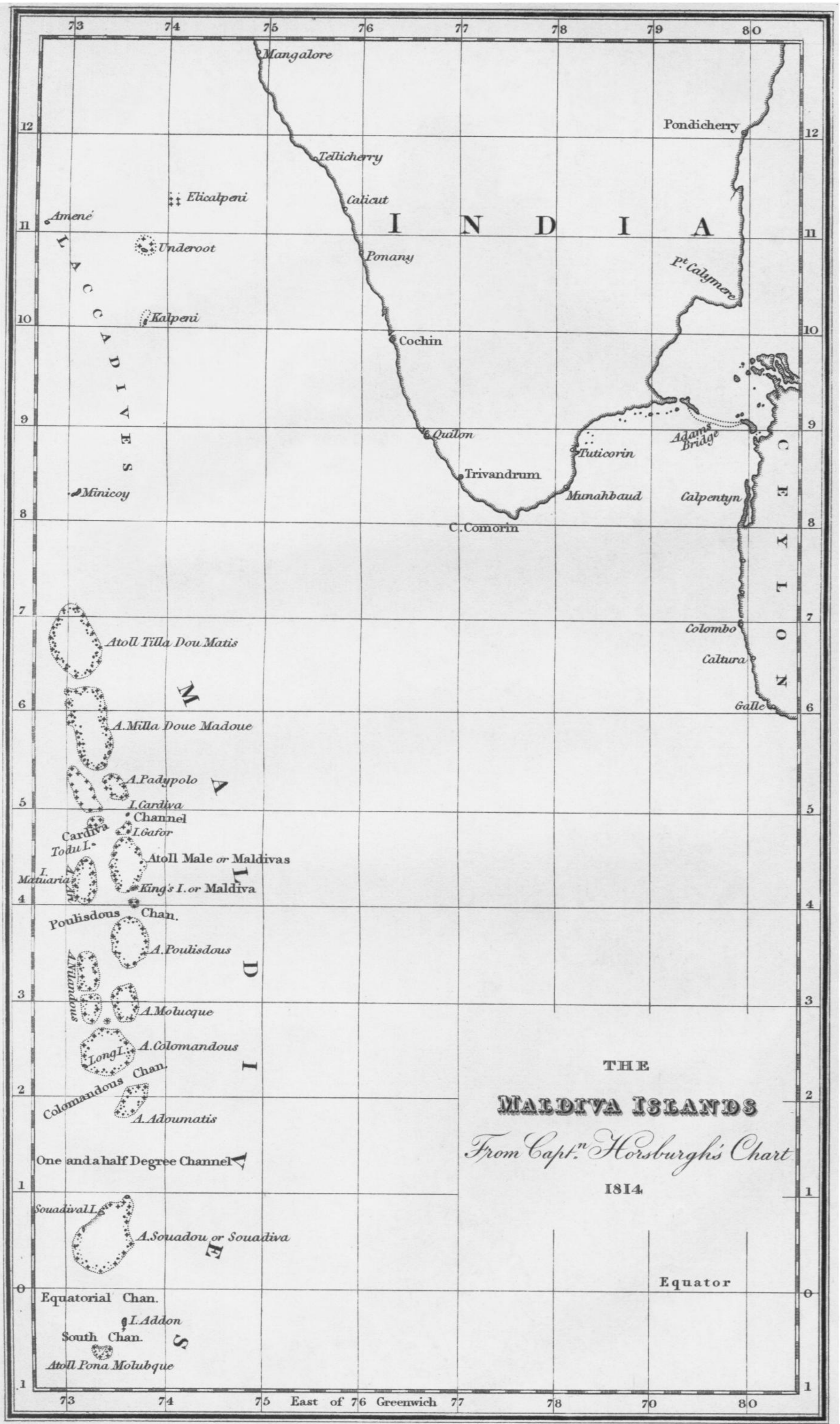
* [New Shetland was supposed to have been seen also by Sir Francis Drake; and was certainly discovered and used as a sealing station by the Anglo-American merchants of New York, so far back as 1812-13. It was still, however, literally, a rediscovery by Mr. Smith in 1819, he having published his intelligence, and given it to the world; while they cautiously guarded theirs to preserve the monopoly.]



THE

MALDIVA ISLANDS

From Captn. Horsburgh's Chart

1814

Published for the Journal of the Royal Geographical Society, by John Murray, Albemarle St. London. July 1832. J. & C. Walker Sculpt.

the Chagos, and adjacent islands. He there adverts to a manuscript in his possession, belonging to the late Sir Joseph Banks, which, from *internal evidence*, was earlier than the year 1575. ‘ This very curious manuscript (observes Mr. Dalrymple) is painted on parchment, with the Dauphin's arms, and contains *much lost knowledge*. Kerguelen's Land seems plainly denoted; and the *east coast* of New Holland, as we name it, is expressed with some curious circumstances of correspondence to Captain Cook's manuscript. What he names

Bay of Inlets, is in the manuscript called Baye Perdue.
Bay of Isles „ „ R. de beaucoup d'isles.
Where the *Endeavour* struck „ Coste Dangereuse.

So that we may say, with Solomon, (observes the late celebrated hydrographer,) “ There is nothing *new* under the sun.” ’

Aristotle, in his Treatise on the World, dedicated to Alexander the Great, adverting to the situations of the larger islands known at that time, observes, that ‘ Taprobane (Ceylon) and the island called Phebol, which is situated towards the Arabic gulf, are not inferior in magnitude to the Britannic islands.’ There are no islands in those seas of sufficient magnitude to answer the above description, excepting Socotra and Madagascar; the former of which seems to have been well known to Aristotle, for it is said that, at his request, Alexander brought a colony from Greece to this island, in order to secure the trade carried on with aloes. On the other hand Madagascar is not near the Arabic Gulf; and it seems, therefore, uncertain, whether Socotra or Madagascar be the island mentioned by the great philosopher, under the name of Phebol, though the latter is much the more probable.

The preceding remarks are merely introductory to the observations now to be given, concerning the Maldiva islands, and which are intended to elucidate in some measure the navigable channels and geographical limits of these islands, long obscured from the knowledge of Europeans, until lately a re-discovery of several safe channels has been effected.

This coral chain of innumerable isles and reefs extends nearly on a meridian from latitude 7° 6′ north to 40′ of south latitude, or 466 geographical miles; but in no part is the breadth of the chain thought to exceed 46 or 48 miles in a direct line, although the westernmost limit of the northernmost group, or Atoll, is in longitude 72° 48′ east, and the easternmost boundary of the chain is in longitude 73° 48′ east.

As this extensive and remarkable barrier of isles and dangers is situated directly in the route of ships coming from Europe, and destined for the island of Ceylon, or the southern parts of the peninsula of Hindostan, it may appear strange that an exploration of the Maldivas has never been undertaken, more particularly as they have been much dreaded by navigators. In reply, and in justice to the Court of Directors of the East India Company, it ought to be known, that a recommendation has several times been transmitted to the Bombay government to this effect: but unfortunately, the unavoidable employment of the Company's marine vessels on regular service, has always prevented the laudable suggestion of the court from being acted on.

An exploration, however, of four safe channels has been effected amongst the southern Atolls, by the skilful exertions of Captain W. F. W. Owen of the Royal Navy, and other modern navigators, of great importance to such ships as frequent those seas. The southernmost is *Addon* or *South Channel,* about five or six leagues wide, formed between Pona Molubque Atoll (the south Atoll) and the island Addon, which isle is in latitude 0° 20′ south, and about five miles in length.

The *Equatorial Channel,* formed between Addon isle to the south, and Atoll Souadou or Suadiva to the north, is ten leagues wide, and clear of danger, the southern limit of this Atoll being in latitude 0° 11′ north. But the best of the old charts mark the south limit in latitude 0° 3′ south; and Pirard de la Val, who resided long among the Maldiva islands after being shipwrecked in the Corbin in 1602, describes the Equatorial Channel as twenty leagues wide, and of greater breadth than any of the other channels,—which is not correct, as this channel is only ten leagues wide, and much narrower than the other channel now to be described.

The *One and a Half Degree Channel,* is seventeen leagues in breadth, formed between Suadiva Atoll and Adoumatis Atoll, the northern limit of the former being in latitude 0° 58′ north, and the south extremity of Adoumatis Atoll in latitude 1° 49′ north, longitude 73° 33′ east, these boundaries of the channel bearing nearly *true* north and south of each other. This is the widest and safest of any of the Maldiva channels, and is now frequently used by ships proceeding towards Ceylon in the westerly monsoon.

Collomandous Channel, is only seven or eight miles wide, but may be considered safe according to the report of Captain Chatfield, of the ship Daphne, who passed through it, August 27, 1822; and his Majesty's ship, Sir Francis Drake, had previously gone through it in July 1808. On the south it is bounded by Adoumatis Atoll, the northern isles of which are in latitude 2° 7′ and 2° 9′ north; and on the north side, its boundary is the southern edge of Collomandous Atoll, situated in latitude 2° 13′ north, longitude 73° 21′ east.

These four channels mentioned above were, until lately, unknown to English navigators. It may also be noticed here, that the isles Diego Rais, Gama, and others, placed in the old charts near the southern limit of the Maldivas, have no *real existence;* but the error probably originated in ships which saw the island Addon, or else the south group, Pona Molubque, and marked them down as isles far detached from the Maldivas, arising from the true positions of these ships being unknown, when they were navigated by dead reckoning.

We are yet very ignorant of the geographical situation of any channel to the northward of those already noticed, although other channels are known to exist, one of which, supposed to be in about latitude 4° north, or a little under, formed between Poulisdous Atoll to the south, and Male Atoll to the north, and called *Poulisdous Channel*, is thought to be rather contracted and unsafe.

Cardiva Channel, although little known to modern navigators, is thought to be very safe, and it appears to have been much frequented about two centuries ago, as may be perceived by the following account of Captain Davis, of Limehouse, who was pilot of a Dutch ship in 1600. On the 23d of May, in this year, they fell in with the Maldiva islands, and anchored; but the situation is not given: here they remained till the 27th, when they weighed, and struck into the true channel, called *Maldiva*, by Davis, which name seems to have been appropriated to the Cardiva Channel at that time. He describes it to be in latitude 4° 15′ north, that vast numbers of ships, from all 'parts, went through this channel, which was the only safe sailing, as to miss it was generally fatal.' The latitude of this channel, 4° 15′ north, as stated by Davis, cannot be correct, as this parallel passes directly over the centre of Ari Atoll, and also over Male Atoll; but the Cardiva Channel is, no doubt, several leagues farther north, if any reliance can be placed on observations taken on board the Company's ships Abington and Josiah, which ships passed through it on the 3d and 4th of March, 1704, on their voyage from England towards Madras, in company, and made the latitude about 4° 50′, or 4° 45′ north. These ships having fallen in with the eastern side of the Maldivas, during light north-easterly winds, were drifted into the Cardiva Channel, and carried through it to the westward by a current running at the rate of two miles per hour.

The Concord, bound from England to Madras, passed through this channel, September 8th, 1709, according to the following extract taken from that ship's journal. At one A.M. saw land on the starboard bow:—'At two and a half A.M. bore away N. by E., thinking we were in a fair way to round Ceylon; but soon after, seeing land to the S.W. which we could not weather, tacked and made several boards till nine A.M., then found we were on the west side of the Maldivas: saw houses and people on the shore. Perceiving a large opening to the eastward, we resolved to proceed through, and found it a *large commodious channel*, in which no ground was obtained. At noon we were within the islands, the westernmost one in sight, bearing W. by N., distant three miles, when the latitude, by good observation, was 5° north.'

These islands were probably those of Goidu Atoll, which form the northern side of the channel; and from the noon station given above, the Concord steered mostly about E.N.E., twenty-four miles distance, until five P.M., at which time an island, thought to be Cardiva, bore south, distance two miles, and afterward no more islands were seen to the eastward in steering out in that direction. The variation of the compass at this time, 1709, in the Cardiva Channel, was about 7° westerly. The Concord's observation at noon appears to make the western entrance of the channel in about latitude 4° 50′ north, and not differing much from the observations of the Abington and Josiah.

Having briefly described all the navigable channels between the Atolls of the Maldiva chain, at present known to be safe for large ships, it may be interesting, as well as useful, to give some extracts from journals of the Company's ships, in order to prove that all the Atolls are not circumscribed by a *continued chain* or barrier of reefs and isles; but that, on the contrary, there are several openings in these barriers, safe for ships, and also sufficient depths of water for ships to pass over some of the Atolls from one part to another, inside of the sea-wall or barrier.

March 20th, 1682.—The ship Recovery, from Bengal, wind E.N.E., at noon observed latitude 5° 30′ north, then saw the Maldivas, the nearest island, N.W. by W., about four or five leagues distance, made it 6° 30′ meridian distance west from Point de Galle.

March 21st.—Light easterly winds in the night, with a hard squall at four A.M. At daylight found the current had set us to the N.W. among the islands, being nearly surrounded by them. At ten A.M. a boat came to us with a pilot, named Husan Tackra, who resides at the island Mapara. At noon anchored in twenty-five fathoms sand, Mabar, or Mafer Island bearing E.S.E., Watten Island E. by N., Landu N.E. by E., Malendu N.E. The weather being unsettled, with thunder, lightning, rain, and calms on the 22d and 23d, and stormy at N.E. on the 24th, we remained with two anchors down for security at this place until March 26th, when we weighed with a N.E. wind at four A.M. and steered S.S.E. and south till six P.M., then anchored in twenty-four fathoms.

March 27th.—At two P.M. weighed with the wind north-easterly, steered between two islands, and at nine P.M. anchored in twenty-two fathoms near the island Seckdiva, or Sediva, on which stands a pagoda.

March 28th.—With the wind to the westward of north, weighed at one A.M., and at four P.M. passed the island Cordue, or Cardiva, expecting to anchor, but got no ground within half a cable's length of a reef that projects half a mile from the island, therefore passed on, expecting to find anchorage at another island, called Gafer, or Gafor.

March 29th.—Steered south and S.S.E. till seven P.M., with a brisk wind at W.N.W. till we came fair by the island Gafer: being night, and our pilot afraid, and having no soundings, we laid the ship's head to the northward till two A.M., then tacked to the southward, and at eight A.M. passed Gafer, leaving it on our starboard side—our course south, with a light W.N.W. wind, the current setting to the northward.

About three miles to the southward of Gafer there is a strait not above two cables' length from side to side, which we came through; and from this narrow strait bearing south, lies the small island Coddue, or Cagui, where we found soundings of nineteen fathoms, with Muckandu isle bearing S.S.W., not having had any soundings since we left the four islands at Sediva.

March 30th.—At five P.M. anchored in thirty-two fathoms with the island Muckandu bearing west about three miles distance. Our pilot was afraid to carry the ship nearer to King's Island until he received further orders; it being in sight, as we suppose, but he will not tell us. At seven A. M. sent him to a boat which was bound to Maldiva, and he was told that he need not fear to bring our ship nearer in, at the same time demanding to know what guns, and what Urippe (Europe) men we had on board. When our boat returned, weighed with a light breeze at west, the course various, luffing up for one shoal, and bearing away for another, which are easily discerned.

March 31st.—At five P.M. anchored, with Maldiva, or the King's Island, bearing S.S.W., about two leagues. Weighed in the morning, and have turned to and fro all the day.

April 1st.—At three P.M. anchored in twenty-five fathoms, the wind fresh at west. Weighed at daylight, and at eight P.M. anchored at Maldiva Island. Found here two Surat ships, two Achen ships; and one Bengal ship, which left that place about a month before us, and anchored at Maldiva about an hour after us. From Balasore we were thirty days till first anchoring among the islands, and fifteen days more till we reached this place.

In the foregoing abstract from the Recovery's journal, it will easily be seen that she was carried by a N.W. current among the islands of the eastern side of the large Atoll Milla doue Madoue, where she anchored, and remained five days inside of Mafer and the other islands adjacent. That after departing from the above-mentioned situation, she passed over the Atoll Padypolo; afterward entered the Male, or Maldiva Atoll, through a narrow channel at its northern extremity, and then navigated from north to south over the whole extent of the Atoll, sometimes near to islands, but at other times amongst numerous shoals, which were easily discerned, so as to be avoided in navigating among them.

The Company's ship Rochester, from Bencoolen, bound to Madras, on the 14th of February, 1715, fell in with the eastern side of the Maldivas;—at noon she observed, in latitude 3° N., at that time thirteen islands bearing from S.W. to W., distant 2½ or 3 leagues, which islands appear to be those of Molucque Atoll. From this situation she made several tacks, with the wind from eastward, and saw the isles at times bearing to the westward; and on the 15th, at 2 P.M., one of them bore N.N.E. She continued, with an easterly wind, usually light, and a current setting to the southward, to traverse amongst islands till the 21st of February. At sunrise, on the 19th, there were seventeen islands in sight, bearing between S.W., and N.N.E.½E. At noon on this day, the latitude was 3° 25′ N., when thirteen islands were in sight to the northward, different islands from those seen at sunrise. 'On the 20th, at sunset, several islands bore N. by E., and S. by E. ½ E. the nearest distance about 3 leagues. Shoals were observed to unite the northern islands to each other, and, the wind being at eastward, we fell into a good channel just to leeward of the northernmost island, for we could find no ground all night with the deep-sea line; and, at 8 A.M., saw twenty-one islands bearing from N.E.½E. to S.E. by E., distant 4 or 5 leagues. At noon, latitude observed 3° 52′ N., two islands to leeward, one bearing W. by S. and the other W. by N., the latter being the westernmost island in this latitude. Upon our showing French colours, a Maldiva boat came alongside, and supplied us with some fowls. February 21st, steered, N. by W., fourteen miles, till sunset, the westernmost island then bearing S. by E., distant 3 leagues. Having been forced by the current to the westward of these islands, we intend to steer to the northward into 8° or 9°, in the hope of getting a westerly wind to carry us to the eastward. From sunset, steered N. and N.N.W. during the night of the 23d, until sunrise, and no more isles were seen.'

It appears, by the above abstract of the Rochester's Journal, that the isles first seen were those on the eastern part of Molucque Atoll, and during the six days she was navigating among the Maldivas, she probably passed over some part of that Atoll, or between it and Poulisdous Atoll, the next to the northward; and perhaps she passed also over a part of the latter Atoll, and afterwards was drifted to the westward by the current between Nillandous Atoll to the south, and Ari Atoll to the northward. No safe passage or channel hereabout is known to European navigators at present, although the Rochester was carried from east to west by the current, directly over this part of the Maldiva Atolls, and frequently tacking in the night between the groups of isles, without discovering any of them until daylight; by which it may be concluded, that there are navigable channels for ships, either over some of these Atolls, or else between them.

The Rooke Frigate, Captain Simmonds, February 4th, 1700, bound to the Malabar coast, saw the east side of the north Atoll of the Maldivas, the nearest island in latitude 6° 40′ N., was about 2½ leagues distant, having five other islands on each side of it. Several boats came near, but would not come alongside. These islands, Captain Simmonds observes, are not *tied together* as represented in the charts, but are separated from each other, and have fine passages between them. A strong current set this ship along the islands to the northward, and, at 1 A.M., she was carried within 2 leagues of the northernmost island; but at daylight none of the isles were visible, although light airs and calms prevailed during the night. Variation of the compass 7° 5′ W. in the morning, and 6° 57′ W. in the evening.

The Albemarle, from Bombay, bound to England, on the 31st of October, 1707, saw, at 10 A.M., the islands on the west side of the Nillandous Atoll, bearing from N.E. to E., distant 5 or 6 leagues. At noon the observed latitude was 3° 34′ N., by which it appears that this Atoll extends farther north than marked on the chart published in 1784, by the late Mr. Dalrymple, in which chart the Atoll is delineated as a large circuitous reef, *destitute of isles;* whereas, the Albemarle saw the isles at 5 or 6 leagues distance, on the west side of the Atoll last mentioned. This ship had been carried greatly to the eastward by a current, and from the Nillandous Atoll, she steered to the S.S.W. with light winds, but was drifted by the current through the One and Half Degree Channel to the eastward, without seeing any of the islands on either side, until after being through: then, on the 7th of November, she saw the isles on the N.E. part of Suadiva Atoll, which she made in latitude 0° 51′ N., calling them Diego Rays, having no idea that these isles were a part of the Maldivas, or that she had been carried between the Atolls to the eastward; but she thought the isles seen, and called Diego Rays, were situated considerably to the westward of the Maldivas.

About the period when these ships were carried by currents amongst the Maldivas, prodigious errors in the reckoning frequently occurred, as will be perceived by the following brief statement, transcribed from the journal of the Company's ship, Darby, Capt. W. Fitzhugh, bound from England to Bengal. On the 28th of May, 1715, this ship left the Cape of Good Hope, and on the 18th of July, fell in with Se-Beeroo, or Great Fortune Island, in latitude 1° 23′ S., near the coast of Sumatra, which was mistaken for the Maldivas, an error of 1500 nautic or geographical miles, in a run of fifty-one days. With variable winds from S.E. and S.W., she proceeded to the southward, sometimes in sight of the islands, and, when near the South Poggy Island, in latitude 3° S., it is marked in the journal as the southernmost of the Maldivas. Trieste Island, in latitude 4° S. is called Jameo, (or the imaginary island Gamo of the old charts,) thought to be situated to the southward of the Maldivas. She continued steering to the southward, in sight of the high land of Sumatra at times; and, in latitude 6° S., Keyser's Peak was seen: still mistaking the summits of the visible mountains on Sumatra for islands to the south of the Maldivas, she continued to steer to the southward, until August the 2d, in latitude 7° S. She fortunately fell in with a ship, and was informed that the low land then in sight was Clap's Island on the south coast of Java. She had at this time forty men down with the scurvy, and proceeded to Batavia for refreshments.

It is gratifying to contemplate the wonderful improvement of nautical astronomy since the period when these ships belonging to the East India Company were liable to such lamentable errors in their reckoning; for, at the present time, the Company's ships are navigated with such precision, that an error of twenty or twenty-five miles in longitude is considered inadmissible.

About thirty years ago American ships, navigated by dead reckoning in their voyages to India, were liable to errors of a most dangerous kind, by passing up to the westward of the Maldivas, when they thought themselves in the Bay of Bengal. An incident of this kind happened to an American ship bound to Calcutta, which vessel fell in with the high land of St. John, in latitude 20° N., near Surat, and, at first, thought it to be the coast of Arracan. This was a dangerous mistake, for the stormy weather of the S.W. monsoon had commenced, when it is difficult to clear the coast if a ship be driven to the northward of Bombay, on account of frequent severe squalls, and a high sea from the ocean running directly towards the land. But this ship, being a swift sailer, succeeded in making a passage along the coast to the southward, and around Ceylon, after discovering her mistake, and finally arrived at Calcutta. Her commander had been impressed with a belief that fine weather usually prevailed in India, and having previously been employed in trading to the Baltic, he remarked, that he never had seen such terrible squalls in the Gulf of Finland as those experienced on the western side of India.

VI.—*On the same Subject.* Communicated by Captain W. F. W. Owen, R.N. Read April 9, 1832.

Captain Horsburgh's object in the preceding paper appears to be to invite attention to the very remarkable fact, that the Maldiva Islands, one of the earliest discoveries of the Portuguese in the eastern seas, which spread out for above five hundred miles along the western face of India and Ceylon, and which thus lie in the direct route of all ships bound thither, should yet be still comparatively unknown to us. And as he has mentioned my humble services in attempting to remove this reproach, I venture to add some remarks to his, illustrative rather of our ignorance than of our knowledge of these islands; our information concerning which still dates from the early voyagers, and has remained nearly stationary for the last three hundred years.

My attention was first particularly drawn to them in 1806, when I commanded the Seaflower brig of war on the East India station, by the wreck of a French vessel on them, the captain of which was obliged to redeem his liberty, and that of his family and crew, by the sacrifice of his wife's chastity to the Sultan, one of whose privileges is the property of all shipwrecked mariners. I was then at the Seychelles, bound to Madras; and conceiving it a shame that this group should continue an absolute scarecrow to the navigators of the nineteenth century, when it had been familiarly visited by those of the sixteenth and seventeenth, I immediately resolved to seek a passage through them to the eastward, in order to examine its southern extremity in passing. Accordingly the land was made, as expected, in about 0° 10′ north latitude, and a strong current being found to set directly to the eastward, it was clear there was a passage at this place: however, as it was just sunset, and the charts placed islands in unbroken continuity across the very track, it was not thought expedient to run through in the night, blowing as it was a gale of wind, with rain, dead on the islands so laid down in the charts. I consequently hauled up, determining to beat to windward through the night under close-reefed topsails; but waking about four A.M., and hearing the sails flap,—learning also that the wind had suddenly died away, and recollecting that this phenomenon frequently occurred near coral banks, I immediately wore round, and stood in the opposite direction till day-light, when we discovered the reefs within three miles of us astern, so near had we been carried to them. I now examined the equinoctial channel, and ascertained the limits of it, but thick weather prevented my making any critical observations at this time. Thenceforward, however, I omitted no opportunity which offered of prosecuting my inquiries, and, with the assistance of several brother officers,* who had become interested in the same object, and who, with myself, visited different points in succession, as opportunity offered, combined with inquiries among native pilots and others who had at different times approached the group, I at length succeeded in collecting the materials of which Captain Horsburgh availed himself in constructing his first chart, and to which nothing has been since added. I also took every opportunity of disseminating the information that I collected; and even, on one occasion, carried a convoy through one of the passages, to show its practicability experimentally, and to endeavour to overcome the prejudice existing against the navigation in their vicinity: in which I was thus far successful, that the equinoctial and other southern passages are now tolerably familiar, the northern being still, however, entirely unknown; and I regret that I cannot join Captain Horsburgh in entirely acquitting the Court of East India Directors of all blame on this account.

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* Particularly Lieutenant Henderson, of H.M.S. Sir Francis Drake.

The word Maldiva, John de Barros says, is derived from *mal*, signifying, in the Malabar language, a thousand, or uncountable number, and *diva*, an island; and the group, he adds, 'although there are openings in it from five to twenty leagues wide, is yet so crowded in other places as to give the idea of a half-drowned orchard, the depth of water in the intervals being sufficient for the largest vessel, and yet the space in them not sufficient for her yards and sails.' Their productions he also enumerates minutely, especially the cocoa-nut,* both of the ordinary kind and of that called coco-de-mer,† almost peculiar to the Seychelles, the seed of which appears to have been borne thence to the Maldivas by the currents of the ocean, thus showing them to flow principally from west to east, as I found them. The beautiful cowrie-shell he also mentions as abundant, being fished for by a curious but well known process. The branches and leaves of the cocoa-nut are laid together and lashed up into bundles about the size of a wheat-sheaf, two of which constitute what is called a balsa, formed as on the coasts of Chili and Peru, on many parts of which they are the only means by which vessels can communicate with the shore. On these balsas they then take a number of trot lines, baited as we bob for eels, viz. with short threads attached to them at every five or six inches distance, and each with a bit of offal meat for bait, tied by a knot to prevent its slipping off. The shell-fish swallows this, knot and all, and is hauled up with the trot line; nor is this manner of fishing peculiar for cowries only, many other shells of the most valuable sea species being procured in the same way. When the balsas are loaded, they are paddled ashore, and the shells buried in the earth till the fish rot out of them. They are then washed out, and are ready for exportation, 'being so much better,' adds Barros, 'than copper for money, as they neither soil the hands nor render offensive odours.' (And to show that these islands are not without their value in a commercial point of view, were it only for this one article, it may be added, that cowries are at this moment worth not less than 20*l.* a ton in England, and 50*l.* to 60*l.* on the coast of Africa, where the interior seems about to be opened to our commercial enterprise by the Niger, along the banks of which this money is the only currency.)

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* In such esteem is this fruit held in this part of the world, that it is a common saying, both here and all along the Malabar coast, 'as fruitful, as profitable, as beautiful, &c. as a cocoa-tree.'

† Famous as a medicine, and once considered a better counter-poison even than the bezoar stone. When germinating it assumes a peculiar appearance; whence its meat, which is an insipid jelly, is supposed to promote fecundity, and its shell to cure venereal affections. A specimen of the fruit and drawing of the tree are in the Naval and Military Museum. Preparations from them fetch a very high value still in India.

These islands, Barros further says, abound in fish, which, in his days, were salted and exported to all parts of India, with fish-oil and jauggry, or coarse sugar, in exchange for which they import cotton (their weavers being considered the best in India), and rice, cattle, sheep, butter, ghee, &c., of all which trade only a most insignificant fraction yet subsists with Ceylon. 'The king and the people,' he adds, 'are Hindoos, but the subordinate governors are Moors, attaining to their situations by little and little; being admitted as merchants, and afterwards renting the public duties from the king, they are invested with administrative powers in order to enable them to levy the taxes.' I notice this because it is a curious fact, that on the contrary, in all the Arab governments from Muscat to Zanzibar, the money-brokers and renters of taxes as subordinates are mostly Banyans or Hindoos.

A much more minute account of the Maldivas, however, is to be found in the work of François Pyrard de Laval, published in Paris in 1679, and giving an account of his voyages from 1602 to 1607, of which I shall remark by the way, that very many of his descriptions of manners, &c. in the east are correct along the east coast of Africa down to the present day; and an abridged translation of his book would, therefore, I think, be an acceptable and useful present to the mere English reader now. The portion of it, which relates to the Maldivas, does not bear quite the same internal evidence of minute accuracy as the remainder; yet I shall quote from it largely—the work having become scarce.

The geographical description of the Maldivas by François Pyrard begins at his page 71, and is in brief as follows:—

'The Maldivas begin at 8° north latitude, and end in 4° south latitude, being two hundred and forty leagues in length, but seldom exceeding thirty or thirty-five leagues broad; and are from one hundred to one hundred and fifty leagues from the main land of Cape Comorin, Collan, Cochin, &c.

'They are divided naturally and politically into thirteen atollons and provinces. It is extraordinary to see these atollons environed by a great stone wall, in such wise as no space of dry ground even could be so well closed by walls as they are.

'These atollons are generally either round or oval in form, and about thirty leagues in circumference, more or less. They abut each other from north to south without touching, and between each two there are navigable channels more or less wide or practicable for small vessels. When inside an atollon this wall is seen all round to defend it from the impetuosity of the sea; and it is most appalling to behold, when near this bank on the inner side, the waves, following each other from a great distance, at length break against the said wall with a violence indescribable, each wave, particularly at high water, being higher, when in the act of curling over or breaking, than a house of common elevation, and appearing like a snow white wall absolutely inapproachable from without.

'Within these inclosures there are an almost infinite number of islands and islets, amounting altogether to more than twelve thousand; and the king takes his title accordingly—"Ibrahim Sultan, King of the Thirteen Atollons and Twelve Thousand Isles*." The inhabitants declare that the high tides and violent currents are always *diminishing* their number; and Pyrard observes, that each atollon is a shallow bank, and was formerly a single island, since cut up into small parts by the inroads of the waters. But this is not according to the received hypothesis or result of modern observation.

'Within the atollons there is always smooth water, and seldom more than twenty fathoms anywhere, nor even so much in many parts; all the shoals are of rock, stones, or sand, with from two to three feet water on them at low water, or even less on many, so that it would not be difficult to visit all the islands of the same atollon without a boat, were it not for a dangerous large fish, called by the natives *Paimones* (probably sharks), and because the bottom, being mostly of sharp coral, cuts the feet. There is also much of the tree coral, called *aquiry* or ackerry, which being broken into a small gravel is used to make the sugar or honey of the cocoa nut, by boiling it with its water †.'

'Amongst them, there are a number of uninhabited islands, some with trees and herbage, some bare banks of sand, others covered at high, and dry at low water; most of them infested with land crabs (cacouoc), and sea lobsters; and many of them frequented by birds called pingay (*query* penguin,) which lay such a prodigious quantity of eggs, that one can tread no where clear of them. They care little for the natives, who do not eat them ; nevertheless, they are very good food, and are the size of a pigeon, with black and white plumage. The heat of the sand assists them to hatch their young easily *. The sands which are thus used by the birds have no fresh water; but all those with wood on them have fresh water, though on some it is either bad or very scanty.'

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* I believe the actual number to be more than treble or fourfold this number.

† I have never seen such a use made of the cocoa-nut, and the author does not say whether it is boiled in the natural milk of the cocoa, which is not commonly used, or that which results from straining the rasped nut through clean water, which last is always used to make the oil for cooking.

Pyrard then gives the names of the atollons, which it is unnecessary to transcribe here; and adds,—

'The name of the whole chain of the atollons or kingdom, is in their language Malé-ragué, or kingdom of Malé; but the other people of India call it Male-diva, and the people are called by other Indians " Dives," meaning islanders. The channels which separate the atollons, cannot, for the most part, be passed by large vessels; but there are four much wider than the others, which may be navigated by the largest vessels. Nevertheless, they are all extremely dangerous, particularly by night.' He says also,

'I have seen in the Maldives, several charts, whereon the dangers and channels were very exactly marked.

'It is also remarkable, that, as I have before said, the atollons, being all in a line, and abutting each other, separated by channels of the sea, they have openings or entrances, two at each end of each atollon, corresponding to two in the neighbouring atollon; by means of which, the communication between them may be carried on at all times and seasons.

'This is most providential; for if there was only one opening to each, their intercommunication could not be carried on, because of the very rapid currents which set through the channels, at times to the eastward or westward, according to the seasons and circumstances.

'Thus, when the currents run to the eastward and from the westward, the vessels or barks of the Maldivans proceed to sea by the western passage, cross the separating channel, and enter the next atoll by its eastern opening; in like manner in going and returning, so that they never return by the same opening as that by which they go forth. Notwithstanding this great advantage in the natural and providential arrangement of the openings, many of their boats are annually lost, being carried off by sudden storms, or calms overtaking them in their passage from atoll to atoll.

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* Neither have I ever heard of penguins before at the Maldives. The Dutch at the Cape of Good Hope use the penguin to great advantage; on the isolated rocks, such as Dassen Island, where they break all the bad eggs, and take all the good ones weekly, and send many thousands to the Cape market through the year. Like the tame fowl, the penguin goes on laying eggs, if her nest be continually robbed.

'Moreover these entrances differ from each other in breadth; some are tolerably wide, others are very narrow—the widest is not more than a hundred yards, and some are not ten. These gateways or entrances are all of them guarded, as it were, by an island on each side, which, if armed, could always prevent the approach or entrance of any vessel.

'As to the channels which are all called Candou, and separate the atollons, there are four easily navigable, by which large ships may pass through the Maldivas, as many of all sorts do very frequently pass; but they are not without danger, and many vessels are lost every year in them. It is not by design that ships pass through these channels, but the islands are in so long a chain, that it is difficult to avoid them; and in calms, and foul winds, ships are frequently carried on them in spite of their best efforts.'

Pyrard next gives an account of these passages; but, as it is in several places contradictory, and certainly erroneous, I shall not occupy the time of the Society with it, but rather pass to his general notices of the whole group.

'The Maldivas are fertile in fruit and other commodities necessary to sustain man; they produce millet, and another small grain like it, but black like turnip seed; the first is called *oora*, and the latter *bimby:* they have two harvests of them in the year, and make flour of them, which they boil with milk and the sugar of cocoa-nut; they also make cakes and pastry, and other sorts of provision with it.

'They also produce many roots, one in particular named *Itel pool*, which is gathered without being planted; it is round, and as big as the two fists. It is broken and ground down between coarse stones, then exposed to the sun on a cloth to dry, when it becomes a sort of starch or fine white flour, and will keep a long while: it makes excellent cakes or pastry, except that it is heavy on the stomach, and, to be good, should be eaten fresh.

'There are also other sorts of roots called *Alas*, some red like beet, and others white as turnips—these are cultivated and gathered in September only: they will keep nearly through the year, and form the principal article of their food; are cooked in various ways, and with the sugar or honey of the cocoa-nut—they are very well tasted. Wheat is called *Godang*, and rice *Andone*, but neither of them grow on the isles. They import much rice, which enters as a main article of their food in a great variety of messes, and when boiled simply, is used as a substitute for bread. It is also boiled, dried, and then ground into a flour, which is mixed with eggs, honey, or with the milk or oil of the cocoa-nut, and thus makes excellent tarts and other dishes.

'Fowls are in such abundance that they are propagated without domestic care, and are sold commonly at less than a penny each, and three dozen eggs may be had for the same sum. They have many other land birds; their sea birds have already been noticed. Rats and mice are so numerous, as to oblige the natives to build their magazines of provision on piles or posts, and sometimes near the sea, at a hundred yards or more from the shore. There are said to be no venomous animals, except one species of snake, which is very dangerous. There are no horses, and but few horned cattle, which belong all to the king. They are generally brought from other parts, or rather a few were brought as curiosities, and have since multiplied to four or five hundred, for their flesh is only eaten at a few particular feasts in the year. They have no dogs, and have a truly Mahomedan horror of them.

'The atollons are wonderfully abundant in all kinds of fish, large and small, which, indeed, furnish a principal article in the food and commerce of the natives. Sharks are numerous; many of the islanders are devoured by them, and many are seen who have lost legs and arms by them.

'In consequence of this great abundance of all kinds of food, it costs but little to live; four hundred cocoa-nuts are sold for sixpence, five hundred bananas, a dozen fowls, or three hundred bundles of roots, &c. &c. for a like sum.

'It is proverbial that the natives never get rich, but that strangers become so quickly; because the natives have neither care, ambition, nor avarice.

'Throughout these isles there are no close towns, but the houses are built separately, each with its own garden and ground; and the lands of different proprietors are separated by narrow lanes, generally well shaded by shrubs in hedge-rows.

'The houses of the common people are built of the wood of the cocoa-nut tree, and thatched with the leaf; but the chiefs and the most wealthy build with coral, which they fish up from different parts for the purpose; it takes a good polish, and is sawn and hewed into the shapes required. At first it is very white, but loses its colour after some exposure to the weather; and becomes quite black in time.

'The manner of fishing up the large blocks of coral is curious. There is a wood which grows on the islands, called candou*, which, when dry, is lighter than cork; the tree is something like, and of the size of the aspen; it bears no fruit, and is not fit for fuel: but its plank is used as our fir-deals. Having noted the block of coral they want, a rope of sufficient magnitude is attached to it, even at great depths, for both sexes are extremely expert swimmers and divers; pieces of candou are then sunk and lashed to the block, until there be enough of them to float it, and its roots being loosened, it rises to the surface attached to its raft, and is borne by it to the place required. This wood, however, soon becomes water-soaked, when it must be dried in the sun before it can be again used for the same purpose.'

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* Pyrard thus uses the word candou both to designate the passage between the atollons and buoyant wood.

(I shall here take occasion to observe that a belief generally prevails that the blocks of coral resemble vegetables, that a root is necessary to them, that if merely broken down to the surface they continue to grow, but that they may be rooted out. And on this principle a late governor of the new colony of the French at St. Mary's, Madagascar, cleared out and made a beautiful little port at that place; and by similar means the inhabitants of the Maldivas can always secure to themselves good outlets and inlets from and to their atollons. And thus says Pyrard—'The port of the island of Malé, being full of large rocks, so that vessels could not anchor in it, was completely cleared of them, and rendered navigable and safe.')

'There are two languages in the Maldivas, the common, which is peculiar to the people, and the Arabic, which is the learned language, and much in esteem; it is to them what the Latin is to Christians.' (It appears that they have also, at this day, a peculiar alphabet, differing from the Arabic and from the Sanscrit, and its derivatives in Hindostan, Ava, Siam, and the Malay Islands. It is written like the Arabic, from right to left, and the vowels are indicated by points in the same manner. Of this sort is a manuscript in the possession of Sir Alexander Johnston.)

Having thus given a brief outline of what is at present known of the Maldiva Islands, I shall tender the Society some loose hints which the occasion has suggested to me.

Of the island of Diego Garcia, which is the extreme southernmost of the whole group of Maldivas, and long considered as unconnected with any other, we have numerous notices; and Mr. Horsburgh, in his East India Directory, gives an excellent description of it. It is the place of banishment for lepers from the Mauritius and Isle Bourbon, where they make cocoa-nut oil, and catch turtle for exportation; and it is as famous in this way in these seas as Ascension in the Atlantic. Its lagoon forms one of the finest harbours in the world; but it is believed that there are many others of a similar description, and equally good, in the other atollons. When I commanded the Baracouta, in 1811, I entered it by the western channel, and left it by the eastern, which, contrary to Mr. Horsburgh's notice, I found quite clear and safe, with not less than three and a half fathoms in it. And nothing would be easier than to examine the whole of these islands in the same way; for their chief is proud to claim a dependence on the British at Ceylon; whither he sends an annual embassy, bearing presents of the products of the islands, and receiving others in return, with certain privileges of trade.

The word atoll or atollon, used to signify the groups into which the

Maldivas are divided, means, in strictness, only, the chaplet or circle of coral on which the islands rest, and which incloses them—the sea-wall, in short, which Pyrard describes. This, in many places, scarcely attains the surface of the water; in others it forms a long sandy beach, perhaps less than six feet above the level of the sea; and the highest land in the groups does not, I should think, exceed twenty feet. The islands, indeed, are just the higher portions which have gradually become covered with soil and vegetation, and which cease to acquire additional height so soon as this takes place, when the labours of the minute insects to which they owe their formation are diverted into other directions. A remarkable circumstance characterises all the islands which have been seen or visited, and is believed to be found in the whole, namely, their circular shape, inclosing a lagoon, or what has been a lagoon; which is the more striking, as it is found to prevail, almost without exception, in all islands of the same formation. For example, the islands off Cape St. Anne, near Sierra Leone, though by no means so purely coralline in their nature as the Maldivas, (and differently circumstanced, being near the mouth of a considerable estuary, whereas the Maldivas are from one to three hundred leagues from a continent, in which are no great rivers,) retain yet this peculiarity, down even to the smallest of them,—an isolated sand-bank before the entrance of Port Owen Tudor, with not a blade of herbage on it, only two hundred yards in circumference, less than fourteen feet high, situate on the outer edge of the wall of coral to which it belongs, and exposed to the full beat of the Atlantic Ocean,—which yet has on its summit two considerable pools of pure fresh water, some feet in depth. And Sherboro' Island, on the same coast, has a peculiarity still more remarkable; for on its southern shore, or sea-face, there is a lake of pure fresh water of considerable extent, just within high water mark; and inside of, and close to it, another still larger, salt.

All the Maldiva Islands of any extent are richly clothed with wood, chiefly palms; but no edifice has been seen in sailing past any of them, whence it may be concluded, that none exists higher than a cocoa-tree. As Pyrard states that most of them have abundance of fresh water on them, but that some are deficient in this article, some remarks on the anomalous and extraordinary situations in which it is found and not found in different parts of the world, and on its supposed connexion with the growth of cocoanuts, may not be unacceptable, as having fallen under my own observation.

At Madras, which is surrounded by salt water, the purest fresh water must be sought in wells dug below the sea-mark; elsewhere, to whatever depths the wells are dug, the water is brackish;

and this is a land of palms and cocoa-nuts. Again, there is a string of low coral islands in the Mozambique Channel, called the Primera Isles by the Portuguese, which have no palms, but numerous stately casuarina-trees of the largest dimensions. Pits were dug in several of them by the Leven's crew in 1823 fourteen feet deep, and many similar trials have been made by other navigators, but always without success; whence another fact is learnt, namely, that the casuarina pine does not require fresh water at its roots, and, indeed, I have elsewhere seen it even on reefs mostly covered with the sea. These islands, it may be also added, in every respect resemble the Sherboro' and Cape St. Anne Islands already noticed, in character and situation, with this one exception; for they are coralline and near a great continent which produces all the palms abundantly, with many great rivers entering the sea in their immediate vicinity.

Lastly, the great Comoro Island, which is thirty leagues in circumference, and whose mountains, it is believed, rise to the height of eight thousand feet above the sea, is said to retain no water in its earth, being volcanic, though with abundance of cocoa-nuts; and it is very thinly inhabited in consequence, the natives being frequently obliged to satisfy the thirst of their cattle with the young cocoa-nut milk, and never drinking any other beverage themselves. This last circumstance, however, does not always indicate a want of water, for in all the Malayan Islands, and in many parts also of Madagascar and the east coast of Africa, if water is asked for to drink, a young cocoa-nut is always brought and presented with its end cut off.

This paper shall now conclude with a few desultory observations on the currents and tides in the Indian Sea, which, without being of much value perhaps themselves, may excite some attention to this curious subject.

Among the Maldivas, all accounts agree, that rapid currents are very common from the eastward at certain seasons of the year, and still stronger from the westward at other seasons. In September, 1806, or towards the close of the south-east monsoon, little current comparatively was found through the Maldivas. In December, 1810, with the north-west monsoon*, a current exceeding four sea miles an hour, set the Barracouta through the equinoctial channel, and its influence was felt sensibly, but with less force, more than half way across the Bay of Bengal; it is also known to extend from the Seychelles, four hundred leagues to the westward of the Maldivas, as proved by the drifting of the Coco-de-mer.

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* The monsoons in India Proper are distinguished into north-east from October to April, and south-west in the other months; but in the eastern seas, and to the south of the line, into north-west and south-east monsoons. At the Maldivas the north-west and westerly winds are by far the most prevalent.

In November, 1811, a similar current was experienced in the same parts. Although currents, in the opposite direction, do run from the eastward about March, April, and May, and perhaps later in the year, yet their influence is neither so extensive nor so violent. It is, therefore, believed, that these evidences of an accelerated motion of the waters in the open ocean must be occasioned by submarine obstructions approaching much nearer the surface in the regions of the current than towards the southern pole, whence the waters flow.

There is a perennial current from the Querimba Islands, or from 10° S., to the Cape of Good Hope and into the Atlantic Ocean,—which embraces the shores of Madagascar. This current is particularly manifested from the shoal of Pinda, near Mozambique, to Quilliman, in the channel of that name,—round the bank of the south end of Madagascar, and from the river St. Lucia quite round the bank of L'Agulhas. Hence it may be inferred that the Atlantic Ocean is but a larger Mediterranean Sea, whose evaporation requires to be resupplied from both poles; that the channels from the north are insufficient for the purpose in summer; and in winter the congelation must be supplied, whence a constant supply is necessary from the south, the fountain of the great deep. On this hypothesis, a current would necessarily set round Cape Horn likewise; which also is the fact; for although it is not so manifest a few leagues from the Cape, it is sufficiently marked in the straits of Le Maire and Magellan.

From Quiloa, on the east coast of Africa, northwards to the Red Sea, the currents take the direction of the monsoons, and are equally strong in both directions, particularly between Zanzibar and Mogadoxa, or Mukdéesha. The breadth of the stream of strong currents is seldom found great. They can, in general, only be contended against by ships keeping very close to the shores, or crossing them until out of their influence. Those which scour the coasts seldom extend so as to affect navigation more than twenty or thirty leagues beyond soundings in one hundred fathoms. On the desert shores of south-west Africa, quantities of drift wood are seen of such dimensions as could only be furnished from the Mozambique channel or Madagascar, unless, indeed, New Holland or Java should be assigned for their origin. It is remarkable also that the currents above-described, differing as they do from the motion of the tides, which last are known to be semidiurnal, do also differ from them in another particular. The tides are most rapid always near the times of the syzigies; at those times the currents are usually very tame; and when tides are at the neap or most slack, then currents are most rapid. This observation has been verified in those parts of the coasts of Africa subject to currents from the Red Sea to the Gambia.

The phenomena of the tides also still require some familiar explanation to account sufficiently for all their effects. Thus the tide is full at Scilly about six or seven hours before it is full in the Downs, distant more than one hundred leagues; and it is a popular notion that the mass of water to supply the difference between full and low tide flows from at least that distance. But if this were true, the water must move at the rate of fifteen miles per hour; whereas the tides in the Channel never exceed two miles per hour, except near the shores, and then seldom four miles. Do the tides partake in any way of the nature of the billow or wave, whose motion does not depend upon, and may even be opposed to that of the particles of water which compose it? The very different phenomena in the Southern Ocean, deserve remark. It is high-water at Mauritius between twelve and one, and on all the eastern shores of Africa, and both shores of Madagascar, from Cape Guardafui to Delagoa Bay, nearly at the same time, or between half-past three and half-past four o'clock, that is, within the ports facing the ocean, where the tide has not to flow over much extent of tangible soundings. On the outer edge of soundings, in all that extent, it may be said to be high water at full and change, nearly at three o'clock; at the Cape of Good Hope half an hour earlier, or between two and three o'clock; and nearly at the same time in all the South Atlantic, but rather later as we proceed northward. At St. Paul de Loando, Fernando Po, Ascension, and Fernando Noronha, in the Atlantic, and at Delagoa Bay, Mozambique, and Mombas, in East Africa, it is high water on the days of full and change at the same instant, nearly, viz. from four o'clock to half-past four; and it is high water at Rio Janeiro nearly at the same instant as at the Cape of Good Hope, viz. between two and three o'clock. At Sierra Leone and the Gambia, and at Sofala, being situated within the coast-line of soundings, the tides are retarded near three hours.

These are loose notices; but it was thought this general view of the subject might excite some interest, as the various publications, where the tide establishments are recorded, disagree much from each other, and many of them from the fact; which may demonstrate that this is a wide field, worthy of more critical examination and deeper study than it has ever yet received.